Poor lens care compliance... a major risk factor...

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Microbial Corneal Infection

Microbial keratitis (MK) is identified by sudden onset of foreign body sensation or ocular pain, photophobia, "red" eye and discharge and by clinical signs of a corneal epithelial/stromal defect with associated inflammatory response (infiltration) (Stein et al, 1988). MK is often accompanied by anterior chamber reaction (including hypopyon in some cases), ocular discharge, lid swelling and conjunctival injection and it's commonly unilateral. Poor lens care and hygiene, travel, smoking, male gender and young adult age may be risk factors. Overnight orthokeratology may be an additional risk factor. MK has an incidence of about 20 per 10,000 people who use contact lenses for EW wear and about 4 per 10,000 people using lenses for daily wear per year (Schein et al, 1989; Poggio et al, 1989; Cheng et al, 1999). Recent reports suggest that increased risk with EW persists despite dramatic improvements in oxygen transmissibility with soft silicone hydrogel lenses (Schein et al, 2005).

Because MK is sight threatening, always assume that suspicious-looking lesions are infectious and treat them aggressively. If any signs or symptoms occur, immediately discontinue lens wear in both eyes to decrease the potential for bilateral disease.

Bacterial MK (usually attributable to Gram-negative *Pseudomonas aeruginosa*, but also Gram-positive *Staphylococcus aureus* and *Staphylococcus epidermidis*) is primarily associated with EW or continuous wear (Mondino et al, 1986). Poor lens care compliance, especially exposing lenses to fresh water (swimming), also appears to be a major risk factor for *Acanthamoeba* MK (Figure 3) (Shehr-Green et al, 1989).

Managing MK begins with initial timely recognition. Clinicians at hospitals and university medical centers usually obtain cultures and smears of all suspicious lesions. Community doctors alternatively often treat peripheral and small suspected corneal infections empirically (McDonnell et al, 1992).

Begin treatment with an initial "loading" dose using antibiotic drops every fifteen minutes for the first hour or two of treatment, followed by additional drops every hour while the patient is awake. Many clinicians believe fourth-generation fluoroquinolone monotherapy (this is an off-label use — these agents are FDA-approved only for treating conjunctivitis) is as effective as dual therapy with "fortified" aminoglycosides (gentamicin, tobramycin, amikacin) in addition to a cephalosporin or vancomycin, particularly for small and peripheral suspected bacterial infections. Have patients follow up frequently, often at 24-hour intervals if not sooner.

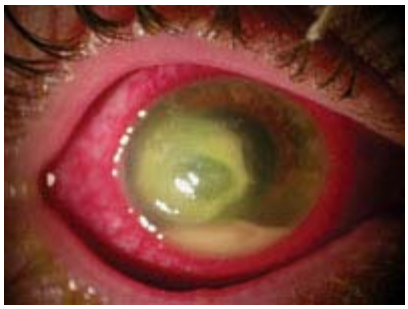

Figure 3. *Acanthamoeba* MK in a soft lens patient who had poor lens care compliance.

Modify treatment by a patient's clinical progress as well as the laboratory identification of microorganisms and their antibiotic sensitivities. Avoid adjunctive patching. The early use of topical steroids is usually contraindicated, but some doctors will intervene with steroids early with the intention of limiting scar formation from stromal infiltration. This treatment runs the risk of allowing inadequately controlled infections of such microbes as *Pseudomonas sp*, herpes and *Acanthamoeba* to escape therapy.

Always consider the possibility of fungal, herpetic, mycobacterial and *Acanthamoeba* MK in any contact lens-related keratitis, especially in cases of chronic disease with initially negative culture results and failure to respond to antibiotic therapy. Increase clinical suspicion of *Acanthamoeba* when the patient reports extreme ocular pain or when you observe an unusual epitheliopathy (reminiscent of herpetic epithelial disease) or peripheral corneal radial neuropathy. Special culture techniques are available for *Acanthamoeba* infections, but tissue biopsy is often necessary.

Medical treatment of *Acanthamoeba* keratitis often employs combinations of antibiotic, antifungal, antiparasitic and biocide/cationic antiseptic agents (Berger et al, 1990). Even considering the current concerns about contact lens solutions and fungal keratitis, fungal MK has been extremely rare among cosmetic lens wearers, but antifungal pharmaceutical agents (both commercial and custom-made) are available. It's important to note that herpetic, atypical mycobacterium and *Acanthamoeba* infections often mimic fungal corneal ulcers and vice-versa. Misdiagnosis and medical failures are common when treating MK caused by these microorganisms.

Adenoviral and herpes viral corneal infections can occur during lens wear. No causative association has been proposed for such viral infections. Patients should discontinue lens wear during viral infections.

Patients should probably discard contact lenses that they've worn during the early stages of an active infection and apply new lenses and replace their storage case once the infection has resolved.

MK associated with lens wear, while rare, remains a concern, and management remains complex. Aggressive and complex medical treatment including subconjunctival injections and/or systemic antibiotic treatment with hospitalization — and perhaps cor-neal transplantation — may be necessary, especially in cases of indolent, refractory or non-bacterial corneal infections. Hallmarks of successful treatment/healing include decreasing pain, reduced inflammatory signs and closing of epithelial defects. It's prudent to refer patients who have severe or refractory inflammatory or infectious ocular disease to a corneal and external eye disease specialist.

General Treatment Recommendations

The most effective way to address lens complications is to prevent them from occurring. One way patients can preclude many complications is to maintain lens care and hygiene, consistent with both common sense and FDA-approved manufacturers' guidelines. Restricting contact lens use to daily wear also should reduce the occurrence of severe complications.

It's also important that lens wearers, especially those who elect EW, understand their role in their own protection. They should return at reasonable intervals for routine care and immediately should symptoms occur. You should always have emergency services available so that symptomatic patients may receive appropriate care in a timely manner.

To obtain references, visit www.clspectrum.com/references.asp and click on document #127.

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